Remarks

This Amendment is in response to the Office Action dated **April 27, 2005.** Each issue in the Action is discussed below.

§112 Rejections

(4)

Claims 13-14 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the scope of claims 13-14 were seen as unclear. A full account of the reasoning in the rejection may be found in paragraph 4, on pages 2-3, in the official action.

In response, the claims have been amended to remove the asserted indefinite nature.

§103 Rejections

(5)

Claims 10, 13, 15 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Acocella et al. (US 5,675,889) in view of DE 4326104A1 or DE 19648728A1. It is asserted that Acocella et al. disclose a method for producing an electronic module as recited in the claims of the present invention except for the surface mounted components (SMC) operatively mounted to the substrate and the simultaneously depositing of the solder cream for the surface mounted components. However, it is further asserted that DE 4326104A1 and DE 19648728A1 disclose the above techniques and it would have been obvious to one having ordinary skill in the art at the time of the invention was made to use the teachings of either DE 43261 04A1 or DE 19648728A1 and combine them with the method invention of Acocella et al. as so to form a desired module having the ball sphere as housing therefrom. As applied to claim 15, it is asserted that each references shows the module having a surface for gripping associated there from. As applied to claim 19, it is asserted that each prior art teaches that the module is being connected to the PCS or substrate. A full account of the reasoning in the rejections may be found in paragraph 5, on pages 3-4, in the official action.

Although Applicant disagrees with the rejection, claim 10 has been amended to further distinguish it from the cited references. Claim 13 has been cancelled and the subject matter therein has been incorporated into claim 10. "Interconnection and/or shielding balls" has also been changed to "interconnection balls and shielding balls".

Applicant traverses because, in part, Acocella et al. do not teach how to mount Surface Mounted Components (SMC's) ensuring an electronic function and interconnection balls on the *same side* of a substrate (there are no SMC's in Acocella). As such, the reference does not teach how to make a simultaneous solder cream deposit for the SMC's and for the interconnection and shielding balls followed by a single reflow cycle to simultaneously solder the SMC's and the interconnection and shielding balls, as required by claim 10.

DE 4326104A1 teaches a way to produce high density electronic systems. Figures 1, 2 and 4a show two substrates (1) and (2) which are connected through bumps (3) and a SMC (18) is placed on substrate (1) between the two substrates. The process taught in DE 4326104 to achieve such assembly, as explained, is the following: 1) Produce solder spheres on the bottom side of substrate 2; 2) Place solder paste on top side of substrate 1; 3) Place substrate 2 with its solder spheres on substrate 1; and 4) Reflow in order to solder substrate 2 onto substrate 1. According to DE 4326104, when there are components between two substrates, it is stated in the reference that: "The components 26 mounted on top side of 21 leave a free zone all around for the pads intended for the solder spheres, on which, **just before** the reflow process solder paste is placed. The first frame 22 is placed with its solder spheres in the solder paste of the first level. During the following reflow process the spheres and the solder paste are reflowed to form one bump ..."

It is clear that, in figure 4 of DE 4326104, the substrate 2 is first equipped with solder spheres, then solder paste is placed on the pads intended for the spheres on the substrate 1 already equipped with its components. Nothing indicates the simultaneous deposit of solder paste for the spheres and for the SMC's. In fact, the reference teaches the opposite. It suggests the deposit of solder paste for the spheres **just before** the reflow process, as the SMC's are already on the substrate. Subsequently, substrate 2 is placed with its spheres 3 onto substrate 1. Finally a reflow cycle allows the attachment of the spheres 3 of the substrate 2 to substrate 1. On one hand, DE 4326104 teaches producing the substrate 1 with its component 18 soldered on it,

and on the other hand the substrate 2 with its solder spheres soldered on it. The assembly of 1 and 18 with 2 and 3 is made after.

In the claimed inventive process of the present application, a module is efficiently produced with spheres and components on the same side in order to have a module which is in the shape of a ball housing and is directly connectable to a substrate. As such, the rejection based on this combination fails because the combination of references does not provide for each and every element of the claimed process. Nor would the claimed process have been obvious to one skilled in the art.

As to DE 19648728, nothing in the reference indicates a simultaneous solder paste deposit for the bumps 16 and the SMC's 17, as required by the claimed invention. For convenience sake, I refer to the corresponding U.S Patent USPN 5744862. At column 4, lines 66, to column 5, line 11, the reference explains how to assemble the SMC's on both sides of substrate 11, but nothing indicates how and when the solder bumps are made. In the explanation of figure 3 (col. 5, lines 13-46), the reference explains how to stack modules, as shown in figure 2, by placing flux or solder paste on the pads 14 or 21 of substrate 20 or of substrate 11 equipped with its SMC's on both sides. Nothing indicates a simultaneous deposit of solder paste for the SMC's and the spheres, as required by the claimed invention. As such, the rejection based on this combination fails because the combination of references does not provide for each and every element of the claimed process. Nor would the claimed process have been obvious to one skilled in the art.

In addition, as noted above, claim 10 has been amended to require that the electronic module have an integrated electromagnetic shield. Nothing in the cited documents teaches producing an electromagnetic shield with the spheres. In the presently claimed invention, the spheres are a part of the electromagnetic shield for the components 2 situated on the lower face of the substrate 1 among the balls.

The balls or the preforms of the presently claimed invention serve three functions. They serve as an electrical connection, a mechanical connection and as electromagnetic shielding of the components situated on the lower face of the substrate among the balls. The cited references fail to provide such attributes. For the above stated reasons, the rejection fails. Withdrawal of the rejection is therefore respectfully requested.

(6)

Claims 11-14 and 20 were rejected under 35 U.SC 103(a) as being unpatentable over Acocella et al. in view of DE 4326104A1 or DE 19648728A1. Regarding claims 11-12, it is asserted in the action that the depositing of soldering cream by serigraphy and/or syringe are old and well known in the art. Therefore, it is asserted that it would have been obvious to one ordinary having skill in the art at the time the invention was made to provide the above teaching into the method invention of Acocella et al. Furthermore, it is asserted that it would have been an obvious matter of design choice to deposit soldering cream by known techniques i.e. by using serigraphy and/or syringe or the like.

Further in the official action, regarding claims 13-14, Applicant's attention is directed to the reasoning given in paragraph 4.

As to claim 20, it is asserted in the official action that it would have been an obvious matter of design choice to make the different portions of the interconnection of whatever form or shape was desired or expedient. A full account of the reasoning in the rejection may be found in paragraph 6, on page 5, in the official action.

For the reasons set forth above in response to the rejection of paragraph 5, the present rejection similarly fails. The two rejections are based on the same art and since claims 11-14 and 20 are dependent upon claim 10, the above arguments equally apply. Withdrawal of the rejection is therefore respectfully requested.

Applicant also would like to take this opportunity to inform the Examiner that Applicant's corresponding European application, which based on the same subject matter, went through an opposition based on DE 4326104 and DE 19648728A1. Applicant was successful in overcoming the opposition, as evidenced by the accompanying document, which indicates the result of the oral proceedings.

The claims are now believed to be in condition for allowance. The prompt allowance of these claims is earnestly solicited. If the Examiner wishes to discuss further issues, he is invited to contact the undersigned.

Respectfully submitted,

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